MULTIMEDIA UNIVERSITY

STUDENT ID NO

# MULTIMEDIA UNIVERSITY

# FINAL EXAMINATION

**TRIMESTER 1, 2018/2019**

## TNS3131 – NETWORK SECURITY AND MANAGEMENT

( All sections / Groups )

13 October 2018
9.00 a.m. – 11 a.m.
( 2 hours )

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**INSTRUCTIONS TO STUDENTS**

1. This Question paper consists of 5 pages **including cover page with 5 questions.**

2. Attempt **ALL questions.** All questions carry equal marks and the distribution of the marks for each question is given.

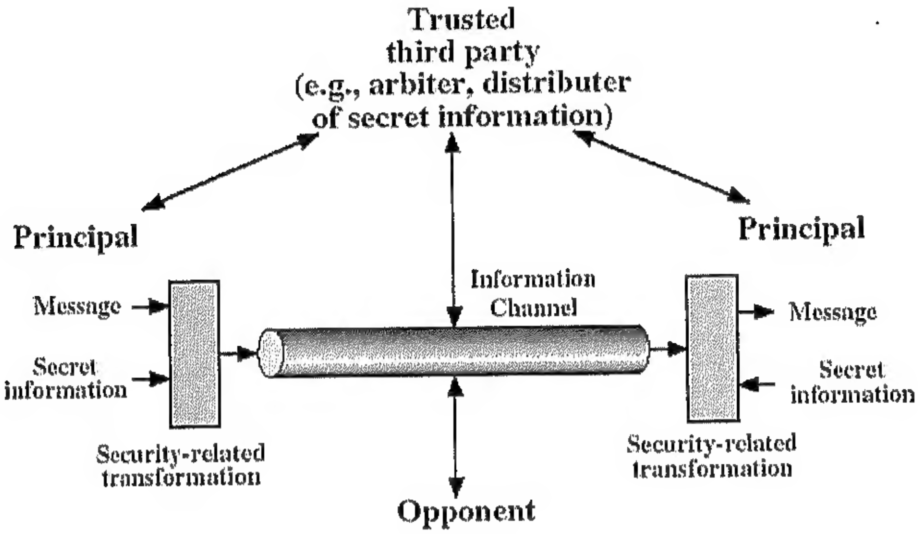
3. Please print all your answers in the Answer Booklet provided.

## QUESTION 1

a) Define *active attack*. List **FOUR (4)** examples of active attacks. [3 marks]

b) Briefly explain **SIX (6)** security services. [3 marks]

c) Given the following model for network security, identify **FOUR (4)** basic tasks in designing a particular security service.



[2 marks]

d) Given the following table, name the types of cryptanalytic attacks based on the amount of information known to the cryptanalyst. [2 marks]

| | Known to Cryptanalyst | Type of Attack |
|---|---|---|
| 1 | • Encryption algorithm<br>• Ciphertext | |
| 2 | • Encryption algorithm<br>• Ciphertext<br>• One or more plaintext-ciphertext pairs formed with the secret key | |
| 3 | • Encryption algorithm<br>• Ciphertext<br>• Ciphertext chosen by cryptanalyst, together with its corresponding decrypted plaintext generated with the secret key | |
| 4 | • Encryption algorithm<br>• Ciphertext<br>• Plaintext message chosen by cryptanalyst, together with its corresponding ciphertext generated with the secret key | |

**Continued ....**

## QUESTION 2

a) Feistel proposed the use of a cipher that alternates substitutions and permutations.

i) Define *substitution* and *permutation*. [2 marks]

ii) Given the following table, briefly explain the design elements of Feistel cipher. [2 marks]

| | Design Element | Explanation |
|---|---|---|
| 1 | Block size | |
| 2 | Key size | |
| 3 | Number of rounds | |
| 4 | Subkey generation algorithm | |

b) A typical stream cipher encrypts plaintext one bit or one byte at a time.

i) Describe **THREE (3)** design considerations for a stream cipher. [3 marks]

ii) Provide a potential advantage of a stream cipher as compared to block cipher. [1 mark]

c) List the functions of public key and private key involved in public-key cryptography. [2 marks]

## QUESTION 3

a) Discuss the environmental differences between Kerberos version 4 and 5 in terms of encryption system dependence, ticket lifetime, and authentication forwarding. [3 marks]

b) Illustrate the format of X.509 certificate. [2 marks]

c) Describe **FOUR (4)** processes for Authentication, Authorization and Accounting (AAA). [2 marks]

d) Given binary input data 00100111 01001100 00010000, identify the character representation for Radix-64 encoding (Refer appendix for Radix-64 table). [3 marks]

**Continued ….**

## QUESTION 4

a) Briefly explain **FOUR (4)** reasons Pretty Good Privacy (PGP) has grown explosively and widely used. [2 marks]

b) Define *S/MIME*. Explain the difficulties in deploying S/MIME in practices. [3 marks]

c) Compare *Transport Mode* and *Tunnel Mode* in terms of delivery services and IP packet protection. [2 marks]

d) i) Define Secure Electronic Transactions (SET). [1 mark]
ii) Illustrate how SET works. [2 marks]

## QUESTION 5

a) Provide **THREE (3)** comparisons for Simple Network Management Protocol (SNMP) version 1 and version 2. [3 marks]

b) List **THREE (3)** intrusion techniques for password guessing. [1.5 marks]

c) Describe **THREE (3)** importance of intrusion detection. [1.5 marks]

d) Explain **FOUR (4)** phases of typical virus or worm operations. [2 marks]

e) In the table format given below, list one advantage and one disadvantage for the listed firewall methods. [2 marks]

| Types of Firewalls | Advantages | Disadvantages |
|---|---|---|
| Packet-filtering routers | • | • |
| Application-level gateways | • | • |

**Continued ….**

## Appendix:

Radix-64 table

| 6-Bit Value | Character Encoding | 6-Bit Value | Character Encoding | 6-Bit Value | Character Encoding | 6-Bit Value | Character Encoding |
|---|---|---|---|---|---|---|---|
| 0 | A | 16 | Q | 32 | g | 48 | w |
| 1 | B | 17 | R | 33 | h | 49 | x |
| 2 | C | 18 | S | 34 | i | 50 | y |
| 3 | D | 19 | T | 35 | j | 51 | z |
| 4 | E | 20 | U | 36 | k | 52 | 0 |
| 5 | F | 21 | V | 37 | l | 53 | 1 |
| 6 | G | 22 | W | 38 | m | 54 | 2 |
| 7 | H | 23 | X | 39 | n | 55 | 3 |
| 8 | I | 24 | Y | 40 | o | 56 | 4 |
| 9 | J | 25 | Z | 41 | p | 57 | 5 |
| 10 | K | 26 | a | 42 | q | 58 | 6 |
| 11 | L | 27 | b | 43 | r | 59 | 7 |
| 12 | M | 28 | c | 44 | s | 60 | 8 |
| 13 | N | 29 | d | 45 | t | 61 | 9 |
| 14 | O | 30 | e | 46 | u | 62 | + |
| 15 | P | 31 | f | 47 | v | 63 | / |
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**End of Paper.**